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## Influence of Government spending on the house prices in Vietnam

**Abstract.** This study investigates for the first time whether government spending is an important driving force of a recent increase in housing price in Vietnam. Using a Vector Autoregressive Model approach with a unique quarterly dataset of the 2011-2015 period from two biggest and most important cities of Vietnam (Hanoi and Ho Chi Minh), the results show that an increase in expenditure for investment instead of the recurrent expenditure or other government spendings pulls up housing price. On the one hand, the findings may reflect that households in the investment projects' areas may be willing to pay for an increase in public spending through taxes and fees. On the other hand, the results may suggest that one of the solutions curbing housing price inflation is to limit government spending in new streets, new infrastructure, and building improvements.

**Keywords:** Housing price; Public spending; VECM; Vietnam

**JEL Classification:** R21; R31; H27; G10

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#### Вплив державних витрат на ціни на житло у В'єтнамі

**Анотація.** У статті вперше досліджено проблему ступеню впливу державних витрат на зростання цін на житло, що останнім часом відбувається у В'єтнамі. Автор за допомогою векторної авторегресії аналізує квартальні дані по цінах на житло в двох найбільших містах В'єтнаму, Ханой та Хошиміні, за період з 2001 по 2015 роки. В результаті автору вдалося з'ясувати, що до зростання цін на житло веде зростання державних інвестицій, але поточні державні витрати не мають такого ефекту. З одного боку, результати дослідження доводять згоду домогосподарств у зоні інвестиційних проектів витрачати більше у вигляді податків та зборів у разі більших державних інвестицій у громадські об'єкти. З іншого боку, отримані результати доводять що домогтися зниження цін на житло можна за рахунок обмеження державних витрат на інфраструктуру, побудову нових вулиць та удосконалення будинків.

**Ключові слова:** ціни на житло; державні витрати; модель виправлення помилок (VECM); В'єтнам.

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#### Влияние государственных расходов на цены на жилье во Вьетнаме

**Анотація.** В статье впервые исследована проблема влияния государственных расходов на рост цен на жилье во Вьетнаме. Автор использовал метод векторной авторегрессии для анализа данных о ценах на жилье в крупнейших городах Вьетнама, Ханое и Хошимине, в период с 2001 по 2015 года. В результате автору удалось выяснить, что к росту цен на жилье ведёт увеличение государственных инвестиций, однако текущие государственные расходы не производят такого же эффекта. Результаты исследования показывают, что налогоплательщики готовы платить более высокие налоги и сборы, если территории, где реализуются инвестиционные проекты в области жилищного строительства, будут получать со стороны государства больше инвестиций в развитие общественных объектов. С другой стороны, результаты исследования показывают, что для снижения цен на жилье целесообразно ограничить государственные расходы на инфраструктуру, модернизацию жилого фонда и кардинальную перестройку уличного хозяйства.

**Ключевые слова:** цены на жилье; государственные расходы; модель исправления ошибок (VECM); Вьетнам.

### 1. Introduction

Recent years have witnessed a significant increase in housing prices, especially in the big cities in Vietnam, such as Hanoi and Ho Chi Minh. For example, housing prices in Hanoi at the end of 2015 were nearly two times higher than in 2013. Such housing price increase raises a question of its causes.

Theory predicts that the housing prices may be determined by many factors such as income, spending, interest rate, inflation, and the availability of credit (Atalay, Whelan, & Yates, 2014; Ferrero, 2015; Oikarinen, 2009; Windsor, Jaaskela, & Finlay, 2015; Windsor, La Cava, & Hansen, 2015). Among these different factors, this paper focuses on the role of public government spending that attracts more attention of researchers and policy makers in recent time (Garcia, Montolio, & Raya, 2010; Khan & Reza, 2014).

There is a growing literature on testing and debating about the hypothesis if housing prices affected by changes in government spending. In general, these studies find that a rise in government spending is likely to increase the property values,

and this pulls up housing prices (Oates, 1969). However, the current study is still significantly different from its predecessors with two features. First, while there are many studies examining this hypothesis in developed countries, pioneering studies such as Garcia et al. (2010), Oates (1969), the evidence from developing countries is limited. As policy-making has started to shift from being data-averse to evidence-driven, there is a need for quantitative studies to address policy-relevant questions. Hence, this study contributes to the research of the problem by providing the first evidence of the role of public spending on housing price in Vietnam. The answer to this question is important because it has immediate policy implications. Inflation of housing prices is one of the urgent challenges facing policy makers in Vietnam. If public spending indeed has an effect on housing price growth, curbing housing price inflation by regulating price might be less pertinent and persistent than stemming from public finance reform programmes.

Second, previous studies often use total expenditure in considering the linkage with housing prices. However, the

various types of government expenditure may affect differently on housing prices. Hence, going beyond the literature, this study considers the role of each component of total government spending on housing prices. It is worth decomposing total expenditure because this can provide a more detailed picture of the role of government spending on housing prices. Interestingly, contrary to several studies, our study reveals that an increase in government expenditure for investment and development leads to a higher housing price, but increases in recurrent expenditure or other government spendings impact negatively on housing price growth.

**2. Methodology and data**

Vector autoregression error-correction models (VECM) are used in this study which considers the changes in housing prices with changes in other explanatory variables. The predictability of changes in the housing prices is considered to associate with lagged-price changes and other fundamental macroeconomic variables. The advantage of VECM allows to examine changes as well as provide explanations for the behaviour of housing prices (Hill, Griffiths, & Lim, 2008; Tuluca, Myer, & Webb, 2000). Hence, according to previous studies (Oikarinen, 2009; Sing, Tsai, & Chen, 2006), the generalized form of VECM is as below in formula 1.

$$D(Y_t) = \sigma_1 + \sum_{i=1}^l (\alpha_{1i}D(Y(t-1)) + \beta_{1i}D(X(t-1)) + \gamma_{1i}D(E(t-1))) + \sum_{i=1}^l \lambda_{1i}EC_i(-1) + e_{1t} \quad (1)$$

where  $D(Y_t)$  is a vector of changes for natural log of house price index,  $X_t$  is a vector of macroeconomic variables, literature including gross domestic product and inflation;  $E(t)$  represents for a vector of local public expenditure. The model also includes an error correction mechanism to correct for short-term deviations of the price series ( $\lambda_{1i}EC_i(t-1)$ ). If  $\lambda_{1i}$  is different from 0, and then a vector of co-integration exist in the system (Sing et al., 2006).

Before applying VECM, a series of testing is included. First, the presence of unit roots of each variable is tested to use the augmented Dickey-Fuller (ADF) tests. All variables in the model are converted in natural logarithm form and first difference to ensure that series are stationary and avoid spurious regression in our case. Second, the appropriate lag length for each variable is selected from several certain criteria, i.e., Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), and Adjusted Likelihood Ratio (ALR) tests.

When optimal lag length is set up and the tests of unit roots are reported, the test for co-integration also is conducted by using the procedure by previous studies (Johansen, 1988; Johansen & Juselius, 1990). Based on the results of selecting the optimal lag length and co-intergration,<sup>1</sup> specific models for the role of the government spending on housing prices are as below:

$$D(HP_t) = \sigma_1 + \sum_{i=1}^3 (\alpha_{1i}D(GDP(-i)) + \beta_{1i}D(CPI(-i)) + \gamma_{1i}D(TE(-i)) + \theta_{1i}D(IE(-i))) + \sum_{i=1}^2 \lambda_{1i}EC_i(-1) + e_{1t} \quad (2)$$

$$D(GDP_t) = \sigma_1 + \sum_{i=1}^3 (\alpha_{1i}D(GDP(-i)) + \beta_{1i}D(CPI(-i)) + \gamma_{1i}D(TE(-i)) + \theta_{1i}D(IE(-i))) + \sum_{i=1}^2 \lambda_{1i}EC_i(-1) + e_{2t} \quad (3)$$

$$D(TE_t) = \sigma_1 + \sum_{i=1}^3 (\alpha_{1i}D(GDP(-i)) + \beta_{1i}D(CPI(-i)) + \gamma_{1i}D(TE(-i)) + \theta_{1i}D(IE(-i))) + \sum_{i=1}^2 \lambda_{1i}EC_i(-1) + e_{3t} \quad (4)$$

$$D(IE_t) = \sigma_1 + \sum_{i=1}^3 (\alpha_{1i}D(GDP(-i)) + \beta_{1i}D(CPI(-i)) + \gamma_{1i}D(TE(-i)) + \theta_{1i}D(IE(-i))) + \sum_{i=1}^2 \lambda_{1i}EC_i(-1) + e_{4t} \quad (5)$$

$$D(CPI_t) = \sigma_1 + \sum_{i=1}^3 (\alpha_{1i}D(GDP(-i)) + \beta_{1i}D(CPI(-i)) + \gamma_{1i}D(TE(-i)) + \theta_{1i}D(IE(-i))) + \sum_{i=1}^2 \lambda_{1i}EC_i(-1) + e_{5t} \quad (6)$$

<sup>1</sup> The results are available on request.

As shown by previous studies (Case & Shiller, 1988; Gliandro, Subhanij, Szeto, & Zhu, 2008; Hui & Yue, 2006), changes in the housing price growth are more closely related to demand variables instead of supply factors. In addition, the main focus is on the relationship between housing price and government spending. Hence, only some fundamental macro-variables such as income proxied by GDP and inflation are controlled for in the model.

The data for gross domestic product, local public expenditure, and CPI were taken from the General Statistics Office of Vietnam, while house price index is obtained from Savills. This study uses quarterly time series data in the period from 2011Q1 to 2015Q4 because housing price index only exists starting from 2011.

Regarding the main interest variable, two different proxies of government spending are used. First, the recurrent expenditure includes different kinds of expenditure. For example, recurrent expenditure includes expenditure for current spending, expenditure for administration, expenditure for economic management, expenditure for wage reform, expenditure for pension, and expenditure for interest. Second, expenditure for investment and development accounts for kinds of expenditure relating with development such as development of infrastructure, street maintenance, and building up new streets. More specifically for the variables in the model, statistical descriptions are displayed as the below table.

**3. Empirical Results and discussion**

First, regarding to the role of the main interest variables in housing prices, the study finds that housing prices in Vietnam are closely related to increases in public expenditure for investment. One period lagged-term has an insignificant effect on current housing prices implying that local investments may take some time to capitalize into housing prices. However, the estimated coefficient from column 1 of Table 2 shows that 1 percent increase in the second lagged period term leads to a surge in housing price by 0.021 percent, keeping other factors constant. These results are in line with findings of other studies (Garcia et al., 2010). This finding also supports for Tiebout model that indicates communities with a higher expenditure have higher values in property and housing.

This result also reflects the fact that when local governments spend money on building up new streets, improve infrastructure, create entertainment areas, and build new parks, they enhance the quality of local public amenities, and produce a positive impact on housing prices.

Interestingly, our study reveal that lagged recurrent spending or total public government expenditure has negative impacts on current housing prices. Such negative impacts can be explained as follow. Total public expenditure includes many kinds of expenditure, where expenditure for recurrent activities and consumption account for over 70 percent. It is noted that these expenditure cannot add the values for society. In addition, an overspending in public finance also might lead to budget deficit, and this in turn may create recession for economy and make housing prices fall. This finding is consistent with other studies (Ruiz & Vargas-Silva, 2016).

Regarding other fundamental macroeconomic covariates, the results show that 1 percent increases in GDP of previous quarters pulls up housing prices by around 0.012 percent, holding other factors constant. This result is as expected, and consistent with many previous studies. For example, as shown by Oikarinen (2009), a change in income as proxied by changes in GDP has a positive impact on housing prices. This may be explained by the fact that the growth of GDP will increase housing affordability and wealth of households. These in turn impact positively on the demand of houses, and pull up housing price index.

Finally, empirical results show that movements in inflation have little impact on changes in house price (Breitenfellner, Cuaresma, & Mayer, 2015). However, the results from this study exhibit significant

Tab. 1: Statistical Descriptions

Variables	Mean	Median	Max	Min	SD
House price (point)	98.7	95.6	125.0	88.0	10.7
Expenditure for investment (billion vnd)	5,536.4	4,943.5	15,302.0	1,613.0	2,702.8
Recurrent expenditure (billion vnd)	7,914.1	6,336.9	24,026.0	1,079.0	5,164.1
GDP (billion vnd)	12,7335.0	98,813.5	396,860.0	19,820.9	91,861.9
CPI (point)	100.3	100.2	102.1	99.7	0.57

Source: General Statistics Office of Vietnam

Tab. 2: Vector Error Correction Estimates

Vector Error Correction Estimates <sup>1,2</sup>					
Sample (adjusted): 2011Q1 2015Q4					
Error Correction:	D(LNHP)	D(LNGDP)	D(LNDAUTU)	D(LNCPI)	D(LNCHIKHAC)
CointEq1	0.053754 (0.03429)	-5.783055 (1.15622)	0.415868 (0.96779)	0.012835 (0.01260)	0.449054 (1.15792)
CointEq2	0.012118 (0.00781)	-1.295948 (0.26345)	0.046949 (0.22051)	0.003183 (0.00287)	0.213942 (0.26384)
D(LNHP(-1))	0.675424*** (0.24158)	33.41998 (8.14470)	4.491209 (6.81735)	-0.005860 (0.08872)	-11.66548 (8.15664)
D(LNHP(-2))	-0.709484*** (0.27684)	14.61411 (9.33344)	-3.594538 (7.81236)	0.112366 (0.10167)	8.868481 (9.34713)
D(LNHP(-3))	0.419030*** (0.21653)	-13.89964 (7.30003)	1.960891 (6.11034)	-0.216459 (0.07952)	-17.04680 (7.31074)
D(LNGDP(-1))	0.004484*** (0.00667)	-0.188980 (0.22472)	0.001936 (0.18810)	-0.005212 (0.00245)	-0.132722 (0.22505)
D(LNGDP(-2))	0.012889*** (0.00612)	-0.134830 (0.20629)	0.097080 (0.17267)	-0.001590 (0.00225)	0.145075 (0.20660)
D(LNGDP(-3))	0.010622*** (0.00668)	-0.546759 (0.22508)	-0.266182 (0.18840)	-0.001968 (0.00245)	0.251629 (0.22541)
D(LNDAUTU(-1))	0.016567 (0.01350)	-2.232210 (0.45512)	-0.172033 (0.38095)	-5.08E-05 (0.00496)	-0.786599 (0.45579)
D(LNDAUTU(-2))	0.021169*** (0.01210)	-2.257155 (0.40810)	-0.262508 (0.34159)	-0.005802 (0.00445)	-0.595726 (0.40870)
D(LNDAUTU(-3))	0.009148 (0.00748)	-1.017834 (0.25226)	-0.440155 (0.21115)	0.000245 (0.00275)	-0.455504 (0.25263)
D(LNCPI(-1))	1.140496 (1.29128)	-19.93762 (43.5345)	-49.90406 (36.4397)	0.083059 (0.47423)	111.1751 (43.5984)
D(LNCPI(-2))	-0.302836 (0.88971)	69.56877 (29.9961)	-45.12378 (25.1076)	0.229746 (0.32676)	82.81516 (30.0401)
D(LNCPI(-3))	-0.055917 (0.61326)	46.63258 (20.6757)	-28.12784 (17.3062)	0.256903 (0.22523)	28.08746 (20.7060)
D(LNCHIKHAC(-1))	-0.008836 (0.01123)	0.834465 (0.37878)	-0.649961 (0.31705)	0.001671 (0.00413)	0.041563 (0.37933)
D(LNCHIKHAC(-2))	-0.006660 (0.00814)	0.602679 (0.27435)	-0.609148 (0.22964)	-0.000217 (0.00299)	-0.087683 (0.27475)
D(LNCHIKHAC(-3))	-0.000821 (0.00497)	0.380300 (0.16753)	-0.437689 (0.14023)	0.001691 (0.00182)	-0.306769 (0.16778)
C	-0.000945 (0.00285)	0.299363 (0.09614)	0.039931 (0.08047)	-0.000699 (0.00105)	0.020876 (0.09628)

Notes: Robust standard errors in brackets, (\*\*\*), (\*\*), (\*) significance at 1% and 5%.

<sup>1</sup> When replacing recurrent government expenditure by total expenditure, negative effects of total government spending on housing prices are also recorded.

<sup>2</sup> D(LNHP), D(LNGDP), D(LNDAUTU), D(LNCPI) and D(LNCHIKHAC) are the first difference for the natural logarithm of housing price, gross domestic product, expenditure for investment, consumer price index, and recurrent expenditure. CointEq1 and CointEq2 are cointegration levels 1 and 2 respectively.

Source: Elaborated by the author

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